Problem L: Hilbert's Puzzle

A river bank. Zeno of Elea and a friend of his, David Hilbert, are peacefully walking around, talking about topics they both enjoy, such as bisection and recursion, when they come across the Tortoise, who is having a swim in the river.

Zeno: Good day, Mr. T! I was just talking about you with my friend Mr. Hilbert. David, this is the famous, the one and only, Mr. Tortoise.

Hilbert: Nice to meet you, Mr. T.

Tortoise: Same here, Mr. H. So what were you talking about when my name came up?

Zeno: David here was explaining to me an interesting invention of his. Picture this: a fractal curve that fills the space entirely.

Tortoise: Hmm, it sound like something Peano taught me the other day. A fascinating topic. Could you tell me more about this curve of yours, Mr. H?

Hilbert: Sure. You start with a simple "U" shape formed by three lines. This is the *first order* of the curve. To draw it, imagine a square of size 1×1, put a pencil on the point $(1/4, 3/4)$, and then move the pencil down, then right, then up, each time moving a distance of $1/2$.

Tortoise: Okay. I'm picturing it in my head right now.

Hilbert: Now, every order n, with $n > 1$ is built like this: reduce the curve of order $(n-1)$ to half of its size. Place a copy of this reduced drawing on the bottom–left and bottom–right corners of the square. On the top–left corner put a copy rotated 90^o to the left, and on the top–right put a copy rotated 90^o to the right. Finally, join all the four pieces with the three shortest possible lines that turn the drawing into one continuous curve.

Tortoise: ... that's a little harder to picture, but I'll get there.

Hilbert: No problem, take your time. By the way, I have published my invention, so you can search about it on the Internet if you want. You may find many helpful pictures. Anyway, I was explaining all of this to Zeno, and then proposed a small puzzle based on my curve.

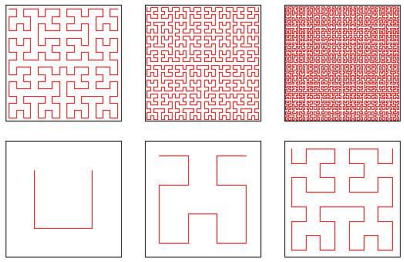
Zeno: That's when I told David that I couldn't figure it out, but I knew someone who surely could, and that's you, Mr. T. Would you like to give it a try?

Tortoise: That goes without saying. A nice puzzle is an invaluable treasure. Shoot.

Hilbert: Okay. It's really simple. Picture a curve H_n (that is, one of my curves of order n). How many line segments does it contain?

Tortoise: Sounds simple, but give me a second to think...

Write a program to answer Mr. Hilbert's puzzle.



Hilbert curves

Input

Input starts with a positive integer **T**, that denotes the number of test cases. Each test case is described in a single line that contains an integer **n**, the order of the Hilbert curve.

$T \leq 10000$; $1 \leq n \leq 10^6$

Output

For each test case, print the case number, followed by the number of line segments that the curve H_n has. Since this number can be very high, print the answer modulo 1000003.

Sample Input	Output for Sample Input
2 1 2	Case 1: 3 Case 2: 13